

EPA REGION IV
SUPERFUND PROGRAM
MEDLEY FARM SUPERFUND SITE
GAFFNEY, SOUTH CAROLINA

PROPOSED
PLAN

FEBRUARY 1991

4.10
Order:

EPA PROPOSES CLEANUP PLAN FOR THE MEDLEY FARM SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) is proposing a cleanup plan, referred to as a preferred alternative, to address contamination at the Medley Farm Superfund Site ("the Site") located in Gaffney, South Carolina. EPA has worked with the South Carolina Department of Health and Environmental Control (DHEC) in reviewing the remedial activities for this site. DHEC has reviewed this alternative and concurs with EPA's recommendations. This Proposed Plan combines several cleanup methods recommended from among all the cleanup options that were evaluated during the **Feasibility Study (FS)** performed for the Site. In accordance with Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, EPA is publishing this Proposed Plan to provide an opportunity for public review and comment on all the cleanup options, known as **remedial alternatives**, under consideration for the Site. EPA will review and consider all public comments as part of the final decision-making process for selecting a cleanup remedy for the Site.

Public Meeting on Proposed Plan for Medley Farm Site

A public meeting will be held to present EPA's Proposed Plan for Remedial Action for the Medley Farm Superfund site. The purpose of the meeting is to provide the community with an opportunity to discuss EPA's Preferred alternatives and the other alternatives considered in the FS with representatives from EPA and the South Carolina Department of Health and Environmental Control. Upcoming site activities also will be discussed.

Date: Tuesday, February 12, 1991
Time: 7:00 p.m.
Place: Gaffney High School Cafeteria
Address: 805 E. Frederick Street, Gaffney, SC

Words appearing in **bold** are included in the glossary at the end of this document.

The preferred remedy includes the following alternatives as described in the Draft FS dated December 1990:

Treatment Using Air Stripping: Recovery of all ground water above **maximum contaminant levels** (MCLs) and treating the extracted ground water prior to discharging to Jones Creek through an air stripping tower; and

Soil Vapor Extraction: Soil vapor extraction in areas exceeding calculated soil remediation levels. If necessary to comply with applicable portions of the Clean Air Act and the South Carolina Pollution Control Act, the extracted vapors will be controlled using an activated carbon unit.

The preferred remedy is described more fully on pages 17-19 of this proposed plan.

This Proposed Plan:

1. Explains the opportunities for the public to comment on the remedial alternatives evaluated for the Site
2. Includes a brief history of the Site and the principal findings of all the field investigations performed at the Site
3. Outlines the criteria used by EPA to propose an alternative for cleanup at the Site
4. Provides a brief analysis of the preferred alternative and all other alternatives evaluated in the FS
5. Presents EPA's rationale for its preliminary selection of the preferred alternative.

To help the public participate in reviewing the cleanup options for the Site, this document also includes information about where interested citizens can find more detailed descriptions of the **remedy process** and the alternatives under consideration for the Medley Farm Site.

THE PUBLIC'S ROLE IN EVALUATING REMEDIAL ALTERNATIVES

Public Informational Meeting

EPA will hold a public informational meeting on February 12, 1991, at the Gaffney High School Cafeteria, in Gaffney, South Carolina, to describe the preferred alternative and the other alternatives evaluated in the FS. The public is encouraged to attend this meeting to hear the presentations and to ask questions.

EPA is conducting a 30-day public comment period, from February 13, 1991 to March 14, 1991, to provide an opportunity for public involvement in the final cleanup decision for the Site. EPA may extend this comment period upon receipt of a timely request. Public input on all alternatives, and on the information that supports the alternatives, is an important contribution to the remedy selection process. During this comment period, the public is invited to review this Proposed Plan and the **Remedial Investigation (RI)** and FS reports, and to offer comments to EPA. The actual remedial action, as presented in the **Record of Decision (ROD)**, could be different from the preferred alternative, depending upon new information or arguments EPA may consider as a result of public comments.

Written Comments

If, after reviewing the information on the Site, you would like to comment in writing on EPA's preferred alternative, any of the other cleanup alternatives under consideration, or other issues relevant to the Site cleanup, please submit your comments to EPA at the public meeting or mail your written comments (postmarked no later than March 11, 1991) to:

Jon Bornholm
Remedial Project Manager
U. S. Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365
(404) 347-7791

EPA's Review of Public Comments

EPA will review all comments received from the public as part of the process of reaching a final decision on the most appropriate remedial alternative, or combination of alternatives, for cleanup of the Site. EPA's final choice of a remedy for the Site will be issued in a ROD scheduled for the end of March 1991. A document, called a Responsiveness Summary, which summarizes EPA's responses to all comments received during the public comment period, also will be issued with the ROD. Once the ROD is signed by the EPA Regional Administrator, it will become part of the **Administrative Record**. The **Administrative Record** contains all documents used by EPA to choose a final remedy for the Site.

Additional Public Information

Because this Proposed Plan provides only a summary description of the investigations at the Site and the cleanup alternatives considered, the public is encouraged to consult the **Administrative Record**, which contains the RI and FS reports and other site-related documents, for a more detailed explanation of the Site and all of the remedial alternatives under consideration. The **Administrative Record** is available for public review at the Region

IV Records Center and at the information repository for the Medley Farm Site. The Regional Records Center is open from Monday - Friday, from 8:00 am to 4:30 pm. The center is located at 345 Courtland Street, NE, Atlanta, GA 30365. The location and hours of operation for the information repository are:

Cherokee County Public Library
300 E. Rutledge Street
Gaffney, South Carolina 29340
(803) 487-2711

Hours: Mon. and Tues.
10:00 a.m. - 8:00 p.m.
Wed. through Fri.
10:00 - 6:00
Saturday 10:00 - 4:00

Copying facilities are available - \$.15/page
Contact: Anne Moseley, Director

The information repository also contains additional selected documents for the site.

Technical Assistance Grant

As part of the Superfund program, a Technical Assistance Grant (TAG) of up to \$50,000 is available to one community group. This grant is to enable the community to hire a technical consultant to assist them in interpreting or commenting on site findings and planned cleanup. Citizens interested in the TAG program may obtain an application package by calling or writing the EPA, Region IV Technical Assistance Grant contact listed below. Other questions or concerns regarding the site may be directed to the Remedial Project Manager, Community Relations Coordinator, or TAG coordinator, listed below.

SITE BACKGROUND

A History of Disposal at the Site

Medley Farm Superfund site in Cherokee County, South Carolina, occupies approximately seven acres of a 61.9-acre tract of land owned by Mr. Ralph Medley. The site is located off Burnt Gin Road (Highway 72) about six miles south of the City of Gaffney. (See map on the following page.) Land use in the vicinity of the site is primarily agricultural and light residential. Until the early 1970s, the Medley property was maintained as woods and pasture land. From approximately 1973 to 1978, several area textile, paint, and chemical manufacturing firms paid to dispose of their industrial wastes on the Medley property. The site was first documented in 1981 when a firm disposing of wastes at the site complied with one of the Superfund waste disposal notification clauses and reported its use of the Medley Farm site to EPA.

In May 1983, in response to a local citizen who witnessed the disposal of barrels on the Medley property, the South Carolina Department of Health and Environmental Control (DHEC) took samples at the site and notified the EPA of the presence of half-buried drums, many of which were leaking. That same month, EPA also investigated and sampled wastes, soil, and water at the site. In June, the site was evaluated using a process called the Hazard Ranking System (HRS) to determine possible Superfund action.

EPA performed an emergency removal operation in June and July 1983. During this operation, EPA removed a total of 5,383 fifty-five-gallon drums and fifteen-gallon pails of waste, 2,132 cubic yards of refuse and contaminated soil, and 70,000 gallons of water and sludge from 6 small waste lagoons on the site. The lagoon areas were then backfilled and graded. Testing of the solid and liquid waste materials removed from the property indicated that the primary chemicals of concern are **volatile organic compounds** (VOCs). The Medley Farm site was proposed for addition to the **National Priority List** (NPL) in June 1986. The site was placed on the NPL in March 1990.

DHEC and EPA conducted several investigative studies on the Medley property from 1983 to 1984. These studies included the sampling of private wells in the site vicinity, a geological study, a more extensive **groundwater** sampling, and a preliminary **hydrogeologic** investigation. During this same time frame, EPA compliance staff also initiated investigations to identify individuals or firms responsible for waste disposal at the Medley Farm site. Over the next two and one-half years, EPA negotiated with several of the **potentially responsible parties** (PRPs), parties potentially responsible for the contamination at the Medley Farm site.

In January 1988, EPA and five PRPs signed an **Administrative Order on Consent** (AOC) in which the companies agreed to carry out and fund the RI/FS of the Medley Farm Site. The PRPs hired Serrine Environmental Consultants, an environmental engineering firm in Greenville, South Carolina, to develop the work plan and other supporting documents for the RI/FS, as well as to conduct the work outlined in these plans. EPA approved Serrine's RI/FS work plan in August 1988. The PRPs submitted the draft RI report to the Agency in March 1990; a revised draft of the RI and a draft FS were submitted in December 1990.

Scope and Role of Action

EPA's plan for remediating the site will focus on contamination of groundwater and surface soils in the immediate vicinity of the site. The action being proposed in the Agency's preferred remedy addresses groundwater contamination in the saprolite and bedrock layers and in surface soils. EPA's preferred remedy is described on pages 17-19 of this fact sheet.

MEDLEY FARM SITE LOCATION MAP

4 10 0006



Map Adapted By Booz, Allen & Hamilton from 1971 Map by the S.C. Department of Highways & Public Transportation

Results of the Remedial Investigation

The RI was conducted in two phases. Phase I of the RI was performed during the period of October 1988 to January 1990. This phase included two series of tests to characterize the nature and extent of contaminants present at the Medley Farm site, if any, and to characterize the site hydrogeology and geology. Field tests conducted in Phase I of the RI included:

- Review of all existing data and a soil gas survey
- Excavation of test pits for source characterization sampling
- Drilling and excavation of soil borings for additional source characterization and to define vertical and horizontal extent of contamination in soils
- Installation of monitoring wells and groundwater sampling analyses for defining vertical and horizontal extent of groundwater contamination
- Surface water and stream sediment sampling to determine extent of contamination on surface water.

EPA and DHEC reviewed the findings of the Phase I analysis. Based on the review of the findings and in order to respond to EPA and DHEC comments, additional studies were conducted by the PRPs to complete the evaluation of risks associated with the Site and to support the selection of a remedial alternative for the Site.

The chemical analyses conducted during Phase II of the RI for the Medley Farm Superfund Site were based on indicator parameters developed at the completion of Phase I; the approach to this phase also incorporated DHEC comments regarding the potential need for additional soil samples to test for **polychlorobiphenyls (PCBs)**. Objectives of the Phase II analyses were to determine the concentrations of contaminants in surface soils, evaluate the aquifer system and potential sources of groundwater contamination, and to describe further the extent of contamination in the **saprolite and bedrock** beneath the Site. The tests conducted during Phase II of the RI included:

- **Collection of surface soil samples** from thirteen locations in the former disposal area and around its perimeter
- **Collection of surface soil samples** from three background areas, to provide a basis for comparison in testing for metals
- **Installation of 14 additional monitoring wells and hydraulic testing** in the new wells
- **Sampling and analyses of ground water** from all water-bearing monitoring wells installed during Phases I and II of the RI

- Measurement of the total depth and groundwater level of the nearby domestic water supply well and survey of the Sprouse well location.

Based on the results of the Phase I and II components of the RI, Sirmine was able to develop a database of information regarding the Medley Farm Superfund Site. For a complete review of findings, please refer to the RI report, located in the information repository identified on page 4 of this fact sheet.

EPA concurs with the following key findings of the RI:

- Contaminants are present at the site in soils in the immediate vicinity of the disposal area and in ground water in the saprolite and bedrock beneath and downgradient of the Site
- Contaminants present in soils are related to distinct, localized, primarily shallow source areas of direct disposal (lagoons or drum disposal areas)
- The small amount of residual source materials found consist of thin, isolated pockets of sludges and debris located at former lagoon sites. This material was typically encountered at depths of 1/2 to 2 feet below ground surface
- Contaminants detected in soils consist of VOCs, Semi-Volatile Organic Compounds (SVOCs), pesticides, and PCBs. PCBs were only detected in samples collected from test pits and surface soil samples. The levels of PCBs encountered were not above the Toxic Substance Control Act action levels
- Concentrations of inorganic constituents detected in soil samples collected from the site are consistent with concentrations detected in soil samples from local background locations and with common ranges reported for natural soils. No elevated levels of inorganic constituents were observed in source characterization analyses
- The only contaminants detected in groundwater were VOCs. VOCs were detected in both the saprolite and bedrock wells, with the highest concentrations occurring immediately beneath and downgradient of the source areas
- Water level measurements show that the Sprouse domestic well is hydraulically upgradient of the Site and has therefore, not been impacted by former disposal activities at the Medley Farm Site
- No organic contaminants were detected in groundwater samples collected from the two background wells (saprolite and bedrock) located between the Site and the Sprouse well
- Concentrations of inorganics detected in groundwater are consistent with local background levels and although several MCLs were exceeded, these elevated

- The groundwater yield from wells installed in the upper portion of the bedrock are significantly higher than from wells installed in the saprolite. The dominant direction of groundwater flow is to the southeast. Vertical gradients at the Site are generally upward and of varying magnitude
- Contaminants detected in groundwater (i.e., VOCs) have not reached the closest perennial discharge area (Jones Creek, located to the southeast and east of the Site). No contaminants were detected in analyses of surface water and stream sediment samples collected from Jones Creek.

Although contaminated groundwater is not discharging directly into Jones Creek, it is the Agency's opinion, based on groundwater analytical and hydraulic data, that contaminated groundwater may be discharging to tributaries to Jones Creek both the the northeast and to the south of the Site. Even if this is occurring, the data generated as part of the RI shows that there is no impact on Jones Creek or surface waters further downgradient than Jones Creek.

A complete description of field tests conducted during the RI and the sampling and analysis results is contained in the RI report, located at the information repository.

SUMMARY OF SITE RISKS

Results of the Baseline Risk Assessment

During the RI/FS, an analysis was conducted to assess conditions at the site and determine the level of risk posed to public health or the environment. This analysis, referred to as the Baseline Risk Assessment identified the hazards posed by the **contaminants of concern** found at the Site, and the various pathways people could become exposed to these contaminants now or in the future. The Risk Assessment procedure consisted of these five steps:

- **Identification of Chemicals of Potential Concern:** identifies the chemical residues detected at the site that pose the greatest potential health and/or environmental risks.
- **Dose-Response Assessment:** identifies the scientific data relating potential chemical exposure (dose) to anticipated health effects (response).
- **Exposure Assessment:** identifies the potential exposure pathways to the contaminants of concern, quantification of exposure point concentrations via these pathways, and the estimation of exposure dose for each pathway.
- **Risk Characterization:** combines exposure and toxicity information to characterize the future and potential future risk associated with chemical residues at the site.

- **Evaluation of Uncertainty and Limitations of the Assessment:** evaluates factors and assumptions potentially affecting the certainty of the assessment and the overall accuracy of the estimated risk.

Contaminated media identified in the Risk Assessment included the groundwater and surface soils in the immediate vicinity of the disposal area at the Site. The contaminants of concern for soils are noted in the table below. The range of concentrations indicates the range of contaminant levels detected in the cases where there was evidence of contamination; the concentration of the chemical detected is noted in terms of the milligrams (mg) of the chemical detected in proportion to one kilogram (kg) of soil. Therefore, the range of concentrations of contaminants in soil is noted as mg/kg. The frequency of detection, noted in the table, refers to the number of times the contaminant was detected over the total number of samples taken.

TABLE 1:
Chemicals Detected in Surface Soil — Medley Farm Site

<u>Chemical Detected</u>	<u>Frequency of Detection</u>	<u>Range of Concentrations (mg/kg)</u>
Volatile Organic Compounds		
1,1,2-Trichloroethane	2/13	110-160
1,1,2,2-Tetrachloroethane	2/13	85-91
1,2-Dichloroethane	6/13	4-200
1,2-Dichloropropane	1/13	21
Ethylbenzene	2/13	7-33
Methylene Chloride	11/13	2-23
Styrene	2/13	3-11
Tetrachloroethene	4/13	5-69
Trichloroethene	4/13	7-70
Vinyl Chloride	4/13	25-210
Semi Volatile Organic Compounds		
1,2,4-Trichlorobenzene	4/15	810-1200
Butylbenzylphthalate	5/15	140-1100
Di-n-butylphthalate	4/15	78-1100
Di-n-octylphthalate	4/15	3600-5400
bis(2-Ethylhexyl)phthalate	6/15	82-33,000
Pesticides/PCBs		
Toxaphene	2/13	330-520
PCB-1254	3/13	200-1900

The contaminants detected in the groundwater at the saprolite and bedrock layers at or near the site are listed in Tables 2 and 3. The quantity of chemicals detected is noted in terms of the micrograms (ug) of the chemical detected in proportion to one liter of groundwater (l). Therefore, the range of concentrations of contaminants in groundwater is noted ug/l. Chemicals of potential concern are indicated with an asterisk (*) in Tables 2 and 3.

TABLE 2:
Chemicals Detected in Groundwater-Saprolite Wells
-- Medley Farm Site

<u>Chemical Detected</u>	<u>Frequency of Detection</u>	<u>Range of Concentrations (ug/l)</u>
Volatile Organic Compounds		
*1,1-Dichloroethene	6/14	1.1-2200
*1,1-Dichloroethane	2/14	38-120
*1,1,1-Trichloroethane	9/14	1.5-3400
*1,1,2-Trichloroethane	2/14	8-13
*1,2-Dichloroethane	3/14	5.4-31
Acetone	1/14	7
Benzene	1/14	0.7
Bromomethane	3/14	1.9-3
Carbon Disulfide	1/14	3
Chlorobenzene	1/14	0.9
Chloroform	2/14	3-4
*Chloromethane	3/14	5.5-26
*Methylene Chloride	3/14	2.1-38
*Tetrachloroethene	5/14	2-200
Toluene	2/14	1-1.5
*Trichloroethene	5/14	6-190
Semi-Volatile Organic Compounds		
1,2,4-Trichlorobenzene	1/2	3

TABLE 3:
Chemicals Detected In Groundwater-Bedrock Wells
— Medley Farm Site

<u>Chemical Detected</u>	<u>Frequency of Detection</u>	<u>Range of Concentrations (ug/l)</u>
Volatile Organic Compounds		
*1,1-Dichloroethene	6/15	2.2-440
1,1-Dichloroethane	2/15	2-3
*1,1,1-Trichloroethane	9/15	4-310
*1,1,2-Trichloroethane	1/15	3
*1,2-Dichloroethane	5/15	12-290
1,2-Dichloroethene (total)	2/15	2-17
*2-Butanone	4/15	6.8-13
*Acetone	3/15	1-18
*Benzene	1/15	11
Carbon Disulfide	1/15	4
Chlorobenzene	1/15	1
*Chloroform	6/15	4-7
Chloromethane	1/15	2
*Methylene Chloride	3/15	48-110
*Tetrachloroethene	5/15	8-230
Toluene	2/15	3-5
*Trichloroethene	5/15	140-720
Semi-Volatile Organic Compounds		
None detected		

Sirrine used the Contract-required Quantitation Limit (CRQL) as a basis for evaluating whether a chemical was a contaminant of concern. The CRQL is the level that a laboratory contracting with EPA must be able to routinely and reliably detect and quantify in a specified sample matrix. Chemicals were labelled as being of potential concern if they were detected at or above the CRQL one or more times in surface soils or groundwater at the saprolite or bedrock layers.

The primary chemical residuals detected above the CRQL in surface soils at the Site were VOCs, SVOCs, PCB-1254, and toxaphene. According to standards established by EPA, the only known carcinogen of the contaminants of concern is vinyl chloride. There is not sufficient evidence to classify any of the other 21 identified chemicals of concern as

carcinogenic to humans. For 15 of the chemicals detected, there is inadequate or no evidence that they are carcinogenic to humans although there may be sufficient evidence of carcinogenic effects on animals. For the remaining contaminants of concern, there is no adequate data upon which to base a classification regarding carcinogenic traits of the chemical. The remaining contaminants have been defined as non-classifiable by EPA.

The chemicals detected in the saprolite layer of the ground water were primarily VOCs. No pesticides or PCBs were detected. The concentrations of inorganic compounds detected, when compared with background concentrations, were found to be either at or below background levels found in local saprolite. Nine of the sixteen chemicals detected in the saprolite wells were categorized as chemicals of concern because they were detected at concentrations above the CRQL. These are noted with an asterisk in Table 2. Chemicals detected in the bedrock layers of the ground water were all VOCs; no SVOCs, pesticides, PCBs, and inorganic compounds were detected. Eleven of the seventeen chemicals detected in the bedrock layers wells were categorized as chemicals of concern; they are noted with an asterisk in Table 3.

The potential exposure pathways considered in the Risk Assessment were:

- Exposure to site-related chemicals in ground water via ingestion of drinking water
- Contact with site-related chemicals in near-surface Site soils through ingestion and absorption through the skin.

Proximity to residential or commercial areas, current and anticipated use of the land and water supply at or near the Site, and accessibility of the Site are general considerations in assessing the level of risk at the Site. There is low population density in the area around the Medley Farm Superfund Site; the closest potentially exposed individuals are the property owners, who live approximately 100 feet west of the Site. Although there is hunting in the property adjacent to the Site, hunting is restricted from the Site property because of a State law prohibiting the discharge of firearms during hunting within 300 yards of a residence. Primary use of the four-mile radius of the site includes small-scale forestry and cattle production, gardening, and hunting at a private club near the property. There are no signs of population growth or development of the property for residential housing; there is limited commercial activity in the area. Access to the property is not restricted, although it is hindered by dense wood surrounding the site area. Because land use is predominantly rural/residential and there is little potential for change in land use at the Medley Farm Site, no future residential or commercial uses of the site were considered in the human health risk assessment.

For a more complete explanation of the risks posed by the contamination found at this Site, please refer to Section 3.0 of the Feasibility Study Report: Baseline Risk Assessments. The FS is available at the information repositories noted previously on page 4 of this fact sheet.

PROPOSED CLEANUP OBJECTIVES AND GOALS OF THE REMEDIAL ACTION

Using the information gathered during the RI and evaluated in the Risk Assessment, EPA identified **several** remedial response objectives for each environmental medium for the site. A **detailed discussion** of these remedial response objectives is presented in the FS report, which is available for review at the information repository. The media considered in the FS include groundwater, surface water, sediments, soil, and facility equipment containing process residuals. The cleanup objectives according to media are listed below.

1. Groundwater Remedial Action Objectives

- Remediate the impacted groundwater to concentrations that are safe for potential users and natural resources which may come into contact with the contaminants of concern.
- Protect the beneficial uses of groundwater downhill, or downgradient, from the site area and surface water into which the ground water discharges.

2. Source Control Remedial Action Objective

- Prevent migration of chemical residues from unsaturated soils into the groundwater system.

To meet these objectives, EPA has established site-specific "target cleanup goals," which are the levels to which the selected cleanup effort must reduce contaminants in the soils and groundwater at the Site in order to be protective of public health and the environment. The remedial alternative ultimately selected for the Site must achieve these goals, and also comply with Applicable or Relevant and Appropriate Requirements (ARARs). ARARs are the State and Federal environmental laws that are applicable or relevant and appropriate to the Medley Farm Site, such as cleanup standards, control standards, and other environmental protection criteria or limitations that are not directly applicable to the site. These laws fall into one of three principal categories:

- (1) Location-specific requirements
- (2) Performance, design, or action-specific requirements
- (3) Ambient or chemical-specific requirements.

Because the **purpose** of the Risk Assessment is to evaluate the risk associated with the site in its present **state**, the Risk Assessment does not consider the level of risk after the implementation of **any** of the remedial alternatives. Additionally, the Risk Assessment is the basis for developing the target cleanup goals EPA has established for this site.

Groundwater Target Cleanup Levels

The remedial action objectives for groundwater include compliance with MCLs, as well as prevention of ingestion of groundwater which results in excess lifetime cancer risk greater than a threshold level defined in section 3.2.1 of the FS report. At present, there is

no current risk associated with groundwater at the Site. EPA is reviewing the potential of future risk that may be posed by groundwater contamination at or near the Site.

Soil Target Cleanup Levels

Remedial action objectives for soils include preventing exposure to soils which result in excess cancer risk greater than the threshold defined in Section 3.2.2 of the FS and preventing the migration of chemical residues from unsaturated soils into the groundwater system. As part of the FS, Sirrine assessed the target cleanup levels for organic chemical constituents in on-site unsaturated soils. This evaluation considered several variables, including meteorological information, chemical distribution data, and physical soil parameters, as they affect the ability of water to filter through the soil. Using this data, target cleanup levels for on-site soils were selected for analysis.

Potential Response Actions

General response actions for the site were developed based on the remedial action objectives for each media. These media-specific response actions are outlined below.

Groundwater:

- Containment of impacted groundwater
- Collection, treatment, and discharge of impacted groundwater
- In-situ, or in place, treatment of groundwater.

Soil:

- Limited action, in which the exposure potential is limited or removed by access restrictions
- Containment actions, in which exposure is prevented by isolating the wastes from the environment
- Excavation and disposal
- Excavation, treatment, and disposal
- In-situ treatment.

In reviewing these response actions, several technologies were screened to determine the capability of alternatives capable of addressing source control and management of chemical migration so that the risks associated with the presence of hazardous constituents, identified in the Risk Assessment, are minimized. These technologies are discussed in the following descriptions of EPA's preferred alternative and the other alternatives considered in the FS.

THE DEVELOPMENT OF EPA'S PREFERRED ALTERNATIVE

EPA's selection of the preferred cleanup alternative for this Site, as described in this Proposed Plan, is the result of a comprehensive evaluation and screening process. The FS for the Site was conducted to identify and analyze the alternatives considered for addressing contamination at the Site. The FS describes the remedial alternatives considered, as well as the process and criteria EPA used to narrow the list to three potential remedial alternatives to address source control and three potential remedial alternatives to address groundwater control. (Refer to the FS for details on the screening methodology.)

EPA uses a standard set of nine criteria to evaluate the alternatives identified in the FS. Although overall protection of public health and the environment is the primary objective of the remedial action, the remedial alternative(s) selected for the Site must achieve the best balance among these evaluation criteria considering the scope and relative degree of contamination present. The criteria are grouped into three categories: *Threshold Criteria*, or requirements that must be met by the alternative; *Primary Balancing Criteria*, or considerations used to develop a decision; and *Modifying Criteria*, or considerations used to determine the acceptability of the alternatives for the public or local officials.

Threshold Criteria

1. **Overall Protection of Human Health and the Environment** addresses how an alternative as a whole will protect human health and the environment. This includes an assessment of how public health and environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or controls placed on the property to restrict access and (future) development. Deed restrictions are examples of controls to restrict development.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the conditions and cleanup options at a specific site. If an ARAR cannot be met, the analysis of the alternative must provide the grounds for invoking a statutory waiver.

Primary Balancing Criteria

3. **Long-term Effectiveness and Permanence** refers to the ability of an alternative to maintain reliable protection of human health and the environment over time once the cleanup goals have been met.
4. **Reduction of Toxicity, Mobility, or Volume** are the three principal measures of the overall performance of an alternative. The 1986 amendments to the Superfund statute emphasize that, whenever possible, EPA should select a remedy that uses a treatment process to permanently reduce the level of toxicity of contaminants at the site; the spread of contaminants away from the source of contamination; and the volume, or amount, of contamination at the site.

5. **Short-term Effectiveness** refers to the likelihood of adverse impacts on human health or the environment that may be posed during the construction and implementation of an alternative until the cleanup goals are achieved.

6. **Implementability** refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the alternative.

7. **Cost** includes the capital (up-front) cost of implementing an alternative, as well as the cost of operating and maintaining the alternative over the long term, and the **net present worth** of both the capital and operation and maintenance costs.

Modifying Criteria

8. **State Acceptance** addresses whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comments on the alternative EPA is proposing as the remedy for the site.

9. **Community Acceptance** addresses whether the public concurs with EPA's Proposed Plan. Community acceptance of this Proposed Plan will be evaluated based on comments received at the upcoming public meetings and during the public comment period.

EPA's PREFERRED ALTERNATIVE

After conducting a detailed analysis of all the feasible cleanup alternatives based on the criteria described in the preceding section, EPA is proposing a comprehensive, multi-component cleanup plan to address the soil and groundwater contamination at and near the Site. The proposed remedy is described below.

Treatment Using Air Stripping

In this alternative, groundwater on the site, as well as contaminated groundwater that is migrating off the site toward Jones Creek and its tributaries, will be collected through a series of extraction wells. Collected groundwater will be treated to meet the substantial requirements of a National Pollutant Discharge Elimination System (NPDES) permit and any other ARARs.

In the air stripping system, the groundwater is pumped from the well and sent to the top of an air stripping tower. While the water cascades down through a large tube, a high-powered fan literally blows the contaminants from the water. The fan then sends the contaminated air out of the top of the air stripping tower. The air stripping system is most effective in removing VOCs; it is not as effective with other contaminants, such as heavy metals. A diagram of this technology and procedure appears below.

Groundwater recovery via extraction wells and submersible pumps is a proven technology with a high degree of dependability. Air stripping is an effective and reliable

process for substantially reducing the chemical volume and toxicity of ground water resulting from the presence of VOCs.

For the purposes of the FS, Jones Creek was considered as the discharge location for treated groundwater. Jones Creek was selected because the feasibility of establishing another discharge system, such as an **infiltration gallery** or **injection well system**, cannot be determined until further field testing is conducted. Use of either system would result in a significant portion of water eventually discharging into Jones Creek. Site ground water flowing into Jones Creek would be protective of aquatic life even if discharged without treatment. Under this alternative, periodic **effluent** sampling would be required. A five-year review of remedy would not be required because pumping would continue until MCLs were achieved for all compounds.

Because there are currently no risks to human health or the environment posed by Site ground water, remediation to MCLs would be implemented to protect human health and the environment in the future. This alternative would attain MCLs and therefore comply with ARARs. Construction and operation of this treatment facility, and emissions from the air stripper would pose no significant short or long term risks to the community or workers.

It is difficult to estimate how long it would take to reach MCLs with this alternative because of adsorption and other effects on chemical interaction between the soils and ground water. Therefore two scenarios for operation and maintenance costs are considered. Costs associated with this option would be for mobilization and construction activities, and operating expenses for power, maintenance, and monitoring activities.

VOCs will be removed from the extracted groundwater via air stripping. In air stripping, the contaminated groundwater is pumped to the top of an air stripping tower where, as the water cascades down, air is forced up through the tower removing VOCs from the groundwater into the air stream. Based on modelling performed during the FS, maximum air stripper emissions would not impact human health and therefore, no further control/treatment is required.

Following treatment, the extracted groundwater will be discharged to Jones Creek. This alternative is described in the FS as Groundwater Control Alternative 2A (GWC-2A).

Estimated Time for Design and Construction: 2 years

Estimated Time of Operation: 10 years

Estimated Construction Cost: \$609,000

Estimated Operations and Maintenance Costs (for 10 years): \$626,000

Estimated Operations and Maintenance Costs (for 30 years): \$1,246,000

Soil Vapor Extraction

EPA's preferred alternative for addressing contaminated soils is soil vapor extraction (SVE). As proposed, SVE would be an in-situ treatment process to remove volatile and some semi-volatile organic compounds from the soil.

A vacuum extraction system consists of a network of air withdrawal (or vacuum) wells installed in the unsaturated zone. A pump and manifold system of pipes is used to apply a vacuum on the air wells that feed an in-line water removal system, and an in-line vapor phase carbon adsorption system for VOC removal. Vacuum wells can either be installed vertically to the full depth of the contaminated unsaturated zone or installed horizontally within the contaminated unsaturated zone. If horizontal vacuum wells are utilized, the wells would require construction by trenching to mid-depth in the soil column. For the purposes of this evaluation, vertical wells were selected due to the depth of the soil strata requiring remediation, geotechnical conditions, and the depth to groundwater.

Although the Risk Assessment indicates that the soil, under present conditions, does not pose an unacceptable risk to human health, the soils will continue to adversely impact the groundwater flowing beneath the Site above acceptable levels. Therefore, the Agency has determined that SVE is warranted for the following reasons:

1. Currently, it is estimated that it would take 20 years of natural flushing to lower the concentration of contaminants in the soils to a concentration where they would no longer adversely impact the groundwater above MCLs. SVE would reduce this time down to one year.
2. SVE will remove contaminants directly from the soil matrix and would not allow them the opportunity to migrate into the water column. A large number of the residual contaminants in the soil are denser than water; therefore, they will tend to sink in the water column, making them even more difficult to remove from the groundwater.
3. The majority of these compounds have a higher volatilizing rate than solubility rate which equates to removing these compounds more rapidly and in greater quantities from an air/soil matrix than a water/soil matrix.

The Agency's rationale for selecting this remedy is further discussed on page 24 of this fact sheet.

The costs provided below include the treatment of the extracted air through and activated carbon unit. This process removes the vaporized organic compounds before the air stream is released into the environment. The actual need or size of the activated carbon treatment unit will be determined during the remedial design phase.

Estimated Time for Design and Construction: 2 years

Estimated Time of Operation: 1 year

Estimated Construction Costs and Factored Costs: \$344,000

Estimated Operations and Maintenance Costs: \$205,000

Estimated Net Present Worth: \$549,000

The estimated total cost (net present worth) of the preferred alternative is \$1,235,000, for 10 years and \$1,855,000 for 30 years.

The public is invited to comment not only on the preferred cleanup alternative, but also on all other alternatives evaluated in detail in the FS. Each of these alternatives is briefly described below. A more detailed description of each alternative can be found in Section 7.0 of the FS, while an overall comparative analysis and summary of each of the three ground water control (GWC) and three source control (SC) is discussed in Section 6.0 of the FS. Please note that the estimated times and costs presented below are taken directly from the FS.

Remedial Alternatives to Address Groundwater Contamination

Three sets of alternatives were developed to address groundwater contamination at the site. The groundwater control (GWC) alternatives are:

GWC-1: No Action

GWC-2: Recovery of All Groundwater Above MCLs

**GWC-3: Recovery of All Groundwater That Could Exceed
MCLs at the Property Line.**

Each of these alternatives has a corresponding set of optional approaches for implementation. These alternatives and the implementation options are described below.

GWC-1: No Action

No action alternatives are included, as required by CERCLA and the NCP, to serve as a baseline for comparison with other ground water control measures. The FS presents two options for implementing the No Action alternative at the Medley Farm site:

GWC-1A No Further Activities, would involve no treatment or other remedial actions.

GWC-1B Long-term Monitoring and Deed Restrictions, includes long-term monitoring of Site ground water and placement of deed restrictions to reduce the potential for development of potable wells on the property.

In both of these options, site conditions would remain unchanged. Slight remediation of contaminated ground water may occur through natural processes such as bioremediation and adsorption. However, the no action option would not lower the ground water contamination levels to be in compliance with ARARs and to meet MCLs.

Implementation of option GWC-1A could begin immediately and would have no negative impacts on future remedial actions. Operating costs for this approach would be incurred because of the mandatory reviews every five years. Implementation of Alternative GWC-1B would be delayed approximately one month because this approach requires

construction of additional monitoring wells. In addition, under the GWC-1B approach, deed restrictions would be used to limit potential uses of ground water, and institutional controls would be required to govern future use of the Site. Capital costs for GWC-1B would be incurred for the well construction, operating costs would include well sampling, chemical analysis, and reporting and review of Site conditions every five years; maintenance costs would be incurred for inspection of the monitoring wells.

Estimated Period of Operation: 30 years

Estimated Total Cost (net present worth):

Option GWC-1A \$140,000

Option GWC-1B \$790,000

GWC-2: Recovery of All Groundwater Above MCLs

This alternative involves the recovery of all Site ground water currently exceeding MCLs through a system of numerous extraction wells. The treatment system for the extracted groundwater would involve installing piping from each extraction well to a common treatment area, a specific treatment system, and discharging the treated groundwater into Jones Creek. In addition to the air stripping technique described in the preferred alternative, the additional treatment technologies evaluated to treat the extracted groundwater are described below.

GWC-2B: Treatment using Carbon Adsorption

In the carbon adsorption system, the contaminated groundwater is forced through tanks containing activated carbon. Activated carbon is specially-treated material that naturally attracts the molecules of the contaminating chemicals. By sending the groundwater through the tanks, the contaminants cling to the carbon and the groundwater is cleansed as it leaves the system. The high cost of replacing or reactivating the activated carbon so that it retains its effectiveness makes this option more costly to implement. Because of the relatively high cost of this technology compared to air stripping, it was not considered in the FS.

Estimated Period of Operation: 30 years

Estimated Total Cost (net present worth): \$2,500,000

GWC-2C: Treatment using Chemical Oxidation

Chemical oxidation is a process by which organic compounds, such as VOCs and SVOCs, can be broken down into carbon dioxide and water. Oxidation can be achieved through a range of technologies. Because of the relatively high cost of such technology compared to air stripping, it was not considered in the FS.

Estimated Period of Operation: 30 years

Estimated Total Cost (net present worth): \$2,500,000

GWC-3: Recovery of All Groundwater That Could Exceed MCLs at the Property Line.

This alternative is designed to address potential groundwater contamination at the property line of the Medley Farm Site. Using the same range of treatment for extracted groundwater, as described in GWC-2, above, this alternative would focus on removing groundwater from the perimeter of the site, as defined in the site map on page ____.

Estimated Period of Operation: 30 years

Estimated Total Cost (net present worth)

- Option A (Air Stripping): \$1,300,000
- Option B (Carbon Adsorption): \$1,900,000
- Option C (chemical Oxidation): \$1,800,000

Remedial Alternatives to Address Source Control

The remedial action must address contaminant source areas that currently are accessible to the public, or that become accessible during the remedial action. These must be remediated to the extent necessary to reduce the risks attendant to exposure to chemical residuals, or they must be isolated to prevent exposure. The response actions to address source control at the Medley Farm Site are presented in three categories, labelled as (SC):

SC-1: No Action

SC-2: Cap Source Areas

SC-3: Soil Vapor Extraction.

The following discussion describes the approach to each of the source control alternatives, as described in the FS.

SC-1: No Action

In the no action alternative, no further remedial actions would occur. A slight level of remediation may occur through natural processes but Short-term effectiveness presents no additional risks to the community or the environment. This alternative would not significantly reduce the toxicity, mobility, or volume of remaining Site residuals. Long-term effectiveness and permanence of this alternative would be reviewed as required by SARA every five years. Site soils would not change significantly over time, and would continue to contribute chemicals to the ground water. Deed restrictions could be placed on future uses of the Medley property to prevent inadvertent exposure to chemical residuals.

This alternative would be protective to human health and the environment. Baseline risks assessments have determined that Site soil does not pose a significant risk to human health. Most surface soil is clean fill and animals in the area do not feed exclusively at the Site. The Toxic Substances Control Act (TSCA) establishes remediation levels for PCBs in areas of unrestricted access, and this alternative would address the associated requirements.

The no action alternative could be readily implemented, and would not hinder any future remedial actions. There are no construction costs associated with this alternative. Operating costs would involve review of remedy every five years.

Estimated Period of Operation: 30 years

Estimated Total Costs (net present worth): \$140,000

SC-2 Cap Source Areas

This alternative involves construction and operation of a low permeability cap over Site soils. Capping is the covering of contaminated wastes, or in this case, surface soils, on the Site. In this approach, a layer of compacted soil would be used to cover the area; this layer would be covered with an impermeable synthetic liner to prevent wind, rain, and melting snow from carrying contaminants beyond their primary location. This approach would also prevent direct human and animal contact with contaminants. The finished cap would be covered with soil and seeded for erosion control and to make it blend into the landscape. Maintenance is minimal, requiring only regular inspections every five years, as required by CERCLA, and the filling of cracks or depressions if they appear.

Construction of a cap would involve heavy earth moving and grading equipment and existing access may have to be improved, and the Site would have to be cleared of vegetation. Dust control measures would be taken to minimize short term potential release of airborne **particulates**. In the implementation of this option, groundwater observation wells not required for long-term monitoring would be abandoned. Drainage swales and a security fence would be constructed along the cap perimeter. Deed restrictions could be included in implementation of this alternative to control Site uses.

Implementation of this alternative would not offer any reduction in toxicity or volume of chemicals at the Site. Use of an impermeable layer to limit the exposure of contaminants would help control migration if this alternative were employed in conjunction with one of the ground water control options. There are no ARARs for capping at the Site, and **Resource Conservation and Recovery Act (RCRA)** disposal requirements are not applicable. However the single synthetic liner cap design would meet an equivalent standard of performance to RCRA requirements.

Long-term effectiveness and permanence of this approach would rely on regular inspections to ensure the reliability of the cap; an inspection and maintenance schedule would be implemented following construction and continue as long as chemical residuals remained at the Site. Evaluation of cap effectiveness would be performed through periodic ground water monitoring. There is a slight possibility that test vents might be required to estimate gas generation potential within the landfill. Because residuals would remain at the Site, SARA requires a review of effectiveness and protectiveness be made every five years.

Operating costs would be incurred to maintain the cap and to develop reports and

reviews of the Site remedy every five years. Biannual sampling would be conducted under this alternative.

Estimated Period of Operation: 30 years

Estimated Total Costs (net present worth): \$1,000,000

EPA's RATIONALE FOR PROPOSING THE PREFERRED ALTERNATIVE

Based on current information and analysis of the RI and FS reports, EPA believes that the preferred alternative for the Medley Farm site is consistent with the requirements of the Superfund law and its amendments, specifically, Section 121 of CERCLA and the National Contingency Plan. Except for the No Action alternatives, all of the alternatives presented in this Proposed Plan would provide overall protection of human health and the environment. In EPA's analysis, however, the preferred alternative identified in the Plan is more readily implementable and cost-effective than the other alternatives considered. In addition, in EPA's estimation the preferred alternative would achieve the best balance among the criteria used by EPA to evaluate the alternatives. The preferred alternative provides short and long-term protectiveness of human health and the environment, will attain all federal and State applicable and appropriate public health and environmental requirements (ARARs), reduces the mobility and toxicity of contaminated groundwater, and utilizes permanent solutions to the maximum extent practicable.

STATE REVIEW

The South Carolina Department of Health and Environmental Control (DHEC) has verbally concurred with the proposed remedy for the Medley Farm Superfund Site in Gaffney, South Carolina.

FOR MORE INFORMATION

If you have any questions about the site or would like more information, you may call or write to:

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GLOSSARY

Administrative Order by Consent (AOC) -- A legal and enforceable agreement signed between EPA and **potentially responsible parties (PRPs)** whereby the PRPs agree to perform or pay for the cost of site cleanup. The agreement describes actions to be taken at a site and may be subject to a public comment period.

Administrative Record -- A file established and maintained in compliance with §113(k) of **CERCLA** consisting of information upon which the lead agency bases its decisions on the selection of response actions. The Administrative Record should be established at or near the facility at issue and made available to the public.

Aquifer -- A layer of rock or soil below the ground surface that can supply usable quantities of ground water to wells and springs. Aquifers can be a source of water for drinking and other uses.

Bedrock -- A general term for the consolidated (solid) rock that underlies soils or other unconsolidated superficial material.

Bioremediation -- A treatment process that uses naturally occurring micro-organisms that exist in soil to degrade, or break down, organic contaminants into non-toxic, harmless materials such as carbon dioxide, water, biomass, and **humus**.

CERCLA -- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980. Also known as Superfund, this law authorizes the federal government to respond directly to releases of hazardous substances that may endanger public health or the environment. The U.S. Environmental Protection Agency is responsible for managing Superfund.

Contaminants of Concern -- Contaminants, identified during site investigations and risk assessments, that pose a potential risk because of their toxicity and potential routes of exposure to public health and the environment.

Effluent -- Waste material that is discharged into the environment. Generally refers to waste materials discharged into surface water.

Feasibility Study (FS) -- The second part of a two-part study which is completed **before** cleanup can begin. The FS evaluates different methods of dealing with the problem and selections of preferred method that will effectively protect public health and the environment.

Groundwater -- Underground water that fills pores in soils or openings in rocks to the point of saturation.

Humus -- The organic part of soil; formed from decomposition of plant or animal matter.

Hydrogeology -- Study of groundwater occurrence and movement in earthen materials.

Infiltration Gallery -- A system for discharging treated ground water by allowing it to penetrate the surface soil and seep into underlying soils.

Injection Well System -- A system of wells into which fluids are injected for purposes such as waste disposal.

In-situ -- In its original state.

Maximum Contaminant Levels (MCLs) -- Enforceable Federal standards reflecting the maximum permissible level of a contaminant in water delivered to any user of a public water system. They are set as close to the maximum contaminant level goal as feasible. MCLs are based on treatment technologies, cost, and analytical methods.

National Priorities List (NPL) -- EPA's list of the top priority hazardous waste sites in the country that are eligible for federal money for cleanup under Superfund.

Net Present Worth -- The amount of money necessary to secure the promise of future payment, or series of payments, at an assumed interest rate.

Particulates -- Dust and small particles of materials blown by the wind. Particulate matter may float in the air for some time; chemicals can become attached to them and be transported some distance from their original site.

Parts Per Billion (ppb) -- Units commonly used to express low concentrations of contaminants.

Polychlorinated Biphenyls (PCBs) -- Family of organic compounds used since 1926 in electric transformers as insulators and coolants, in lubricants, carbonless copy paper, adhesives, and caulking compounds. They are also produced in certain combustion processes. PCBs are extremely persistent in the environment because they do not break down into new and less harmful chemicals. PCBs are stored in the fatty tissues of humans and animals through the bioaccumulation process. EPA banned the use of PCBs, with limited exceptions, in 1976. In general, PCBs are not as toxic in acute short-term doses as some other chemicals, although acute and chronic exposure can cause liver damage. When tested, most people show traces of PCBs in their blood and fatty tissues.

Potentially Responsible Parties (PRPs) -- An organization or individual who may be responsible for generating, transporting or disposing of waste at a site or the site owner or operator.

Resource Conservation and Recovery Act (RCRA) -- A Federal law that established a regulatory system to track hazardous substances from the time of generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent new, uncontrolled hazardous waste sites.

Record of Decision (ROD) -- A legal document signed by EPA that describes: the final remedial action selected for a Superfund site; why the remedial actions were chosen and not others; how much they will cost; and how the public responded.

Remedial Investigation/Feasibility Study (RI/FS) -- The RI/FS is a two-part study which is completed before cleanup can begin. The first part is: The Remedial Investigation (RI), which studies the nature and extent of the problem. The second part is the Feasibility Study (FS), which evaluates different methods of dealing with the problem and selections of preferred method that will effectively protect public health and the environment.

Saprolite -- A relatively thick overburden on the bedrock typical in the Piedmont province where the Medley Farm site is located. The overburden, termed saprolite, is a layer of decomposed bedrock formed in place by chemical and physical weathering.

SARA -- Superfund Amendments and Reauthorization Act enacted by Congress reauthorizing actions and expenditures for the Superfund program through 1991.

Semi-Volatile Organic Compounds (SVOCs) -- Carbon-containing chemical compounds that, at a relatively low temperature, fluctuate between a vapor state (a gas) and a liquid state.

Swale -- A low section of moist or marshy ground.

Total cost -- See definition for net present worth.

Volatile Organic Compounds (VOCs) -- A group of organic compounds characterized by their greater tendency to change into a gaseous state.

MAILING LIST ADDITIONS

To be placed on the mailing list to receive information regarding the Medley Farm Superfund Site, please complete this form and mail to:

Mr. Jon Bornholm, Remedial Project Manager; U.S. EPA, Region IV;
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Affiliation _____

Phone _____

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